

## Glass-ceramic scintillator for biomedical x-ray imaging

Scintillators are the backbone of high-energy radiation detection devices. Most scintillators are based on inorganic crystals that have many applications in medical radiography, nuclear medicine, security inspection, dosimetry, and high-energy physics. In this poster, we present a new type of scintillator that is based on glass ceramics (composites of glasses and crystals). These scintillators are made from  $\text{Eu}^{2+}$ -activated fluorozirconate glasses that are co-doped with  $\text{Ba}^{2+}$ ,  $\text{La}^{3+}$ ,  $\text{Al}^{3+}$ ,  $\text{Na}^{+}$ , and  $\text{Cl}^{-}$ . Subsequent heat treatment of the glasses forms  $\text{BaCl}_2$  nano-crystals (10 - 20 nm in size) that are embedded in the glass matrix. The resulting scintillators are transparent, efficient, inexpensive to fabricate, and easy to scale up. The physical structure and x-ray imaging performance of these glass-ceramic scintillators are presented, and an application of this material to micro-computed tomography is demonstrated. Our study suggests that these glass-ceramic scintillators have high potential for applications in biomedical x-ray imaging.

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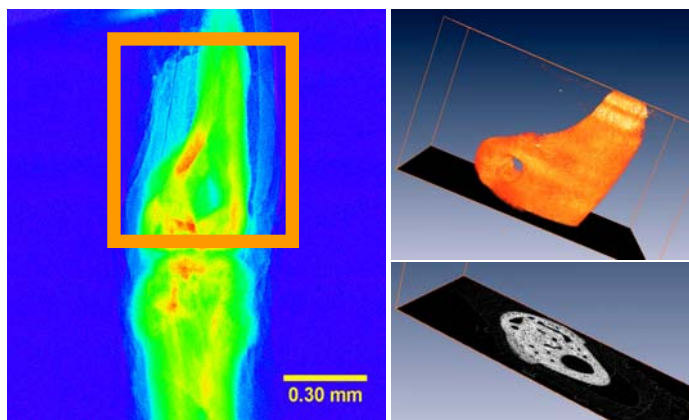


Figure 1: Micro-CT images and reconstructed 3-D image of a mouse finger joint.